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student, even of today, than any American mathematical journal that had preceded it. Its great mission, which it successfully fulfilled, was to interest our college men in the subject. Although we do not find among its contributors the names of any who, in recent times, have become prominent as mathematical investigators, I believe that the stimulus it gave to the study of the subject may have been an important factor in the serious advance which commenced fifteen years later at the Johns Hopkins and other of our great universities.

THE AYER PAPYRUS.*

Edited by EDGAR J. GOODSPEED.

In the Eygptian Room of the Field Columbian Museum, Chicago, there is a Greek papyrus of much mathematical interest. It preserves a series of geometrical processes, in which the areas of various quadrilaterals are determined by methods much less advanced than those of Euclid. The papyrus measures cm. 21.3 x 40.5. Originally it formed part of a roll, written in clear uncial characters on one side only, the writing being in columns. Parts of three columns remain, the second and third being nearly complete, while of the first there are but a few scattered words. The uniformity of the language used, and the preservation of three out of the four figures illustrating the processes of these two columns make their restoration easy and certain. The papyrus comes from the Fayûm, and was brought from Egypt to the Field Museum by Mr. Ed. E. Ayer, of Chicago, in 1895. It belongs to the first century after Christ, but the methods pursued in the calculations, and the senses in which certain terms are used carry back the probable date of the work into pre-christian times and suggest relationship with the school of Heron of Alexandria. The work was apparently a practical treatise on mensuration, designed for use in re-surveying farm-lands of irregular shape, after the annual inundation.

Geometrical figures illustrating the proceses described are appended to them. These figures are covered by numerals indicative of the length of each side, part of a side, and perpendicular, and of the area of each section. It will be observed that in the papyrus these figures are very roughly drawn, and by no means satisfy the proportions thus prescribed for them. For the restoration of the second figure, which is missing from the papyrus through mutilation at that point, I am indebted to Professor E. H. Moore. It should be noted that the word translated "acre" is the Greek "aroura," which is strictly equivalent to about two-thirds of the English acre.

The processes, literally translated, are as follows:

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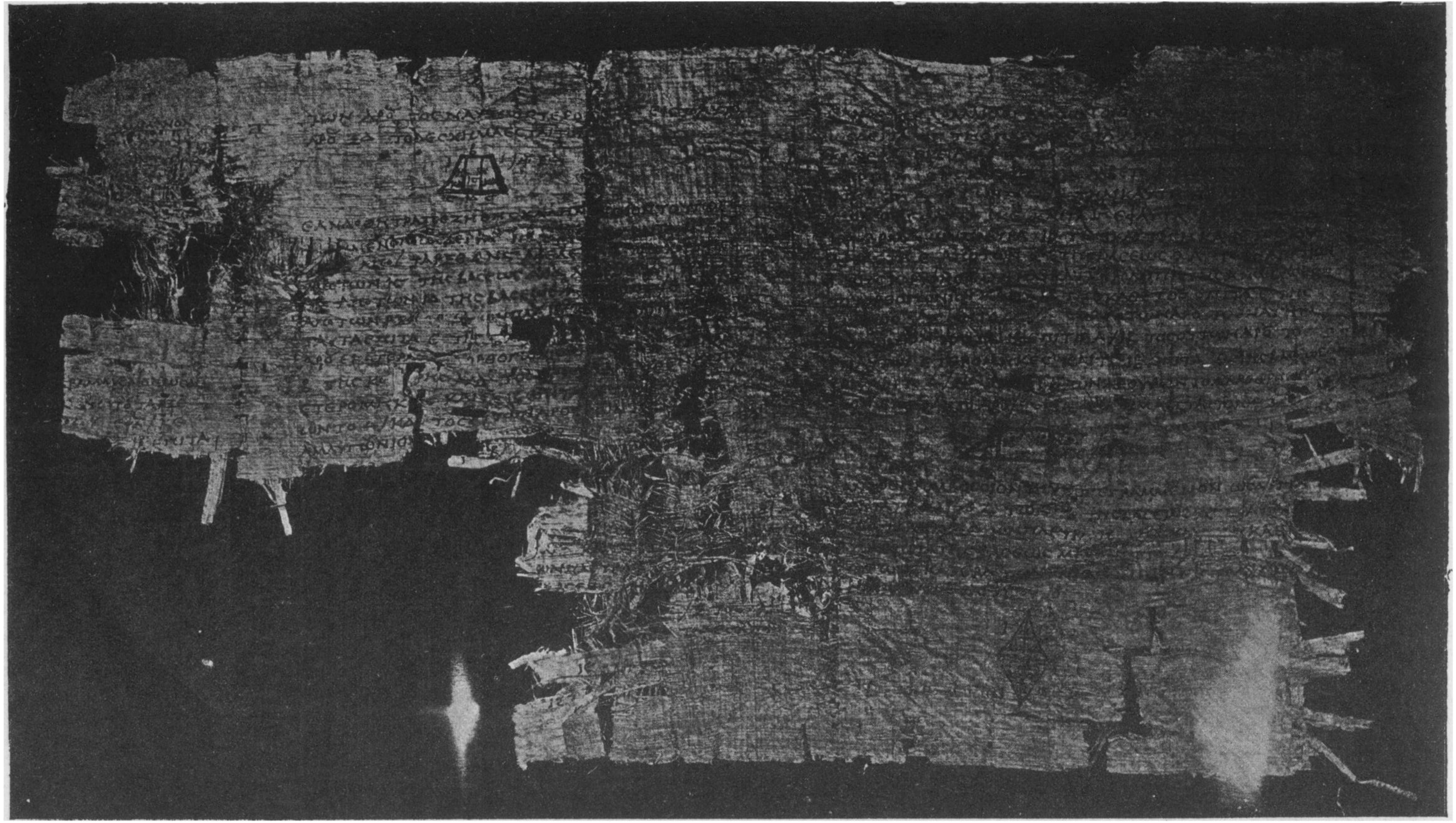
*For the Greek text see Edgar J. Goodspeed, *American Journal of Philology*, Vol. XIX, pp. 25-39.



THE AYER PAPYRUS.

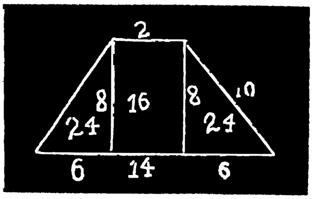
From the *American Journal of Philology*, Vol. X.

Column I (restored).

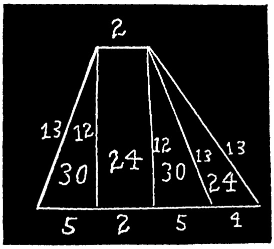
[If there be given an isosceles trapezoid such as the one drawn below, according to the conditions of the problem, the 10 squared=100, and the 2 of the upper side from the 14 of the base leaves 12, ½ of which is 6. This squared=36. Subtract this from 100; the remainder is 64, of which the square root is 8, which is the length of the perpendicular. ½ of this=4, and this by the 6 of the base=24; of so many acres is each of the right-angled triangles. And the 8 of the perpendicular by the 2 of the base=16; of so many]

Column II.

acres is the rectangle in it. Altogether, 64 acres. And the figure will be as follows.



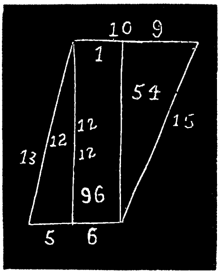
If there be given a scalene trapezoid such as the one drawn below, according to the conditions of the problem, the 13 squared=169, and the 15 squared=225. Subtract the 169; the remainder is 56. Subtract the 2 of the upper side from the 16 of the base; the remainder is 14. Take $\frac{1}{14}$ of 56; it is 4. This from the 14 of the base leaves 10. ½ of this leaves 10. ½ of this=5. This squared=25. Subtract this from the 169; the remainder is 144, of which the square root is 12, which is the length of the perpendicular. This by the 5 of the base=60, ½ of which is 30; of so many acres is each of the right-angled triangles. And the 12 (multiplied) by the 2 of the upper side=24; of so many acres is the rectangle in it. And the 12 multiplied by the 4 of the base=48, ½ of which is 24; of so many acres is the obtuse-angled triangle in it. Altogether, 108 acres. And the figure will be as follows.



[Figure restored].

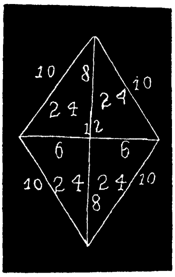
Column III.

If there be given a perallelogram such as the one drawn below, according to the conditions of the problem, the 13 of the side squared=169, and the 15 of the side squared=225. Subtract 169 from this; the remainder is 56. Subtract the 6 of the base from the 10 of the upper side; the remainder is 4. Take ¼ of 56; it is 14. Subtract the 4; the remainder is 10, ½ of which is 5, which is the length of the base of the right-angled triangle. This squared=25. And the 13 squared=169. Subtract the 25; the remainder is 144, the square root of which is 12, which is the length of the perpendicular. And subtract the 5 from the 6 of the base; the remainder is one. The 1 from the 10 of the upper side leaves 9, which is the length of the remainder of the upper base, (which remainder is the base) of the right-angled triangle. And the 12 of the perpendicular by the 5 of the base=60, ½ of which is 30; of so many acres is the right-angled triangle in it. And the 12 by the 1=12; of so many acres is the rectangle in it. And 12 by the 9 of the base=108, ½ of which is 54; of so many acres is the other right-angled triangle. Altogether, 96 acres. And the figure will be as follows:



If there be given a rhomb such as the one drawn below, according to the conditions of the problem, the 10 squared= 100, and ½ of the 12 of the base is 6. This squared=36. Subtract this (from 100); the remainder is 64, of which the square root is 8, which is the length of the perpendicular. This by the (6) of the base=48, ½ of which is 24; of so many acres is each of the right-angled triangles. Altogether, 96 acres.

And the figure will be as follows.



Note.—In order to economize space, the figures are set in the paragraphs to which they belong instead of following them. F.

DEPARTMENTS.

SOLUTIONS OF PROBLEMS.

ARITHMETIC.

166. Proposed by **F. P. MATZ**, Sc. D., Ph. D., Professor of Mathematics and Astronomy in Defiance College, Defiance, Ohio.

A teacher's monthly salary after $m=2$ increases of $p=20$ and $q=10\%$, is $\$M=\$120$. What was the original salary?

Solution by **G. B. M. ZERR**, A. M., Ph. D., The Temple College, Philadelphia, Pa., and **G. W. GREENWOOD**, A. B., McKendree College, Lebanon, Ill.

$$\begin{aligned}\text{Original salary}&=\$M/[(1+p)(1+g)\ldots\text{to } m \text{ terms})\\&=\$120/[(1.10)(1.20)]\\&=\$120\times\tfrac{10}{11}\times\tfrac{5}{6}=\$90\tfrac{10}{11}.\end{aligned}$$